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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,815	07/30/2003	Tsutomu Ohzuku	43888-267	9492

7590 09/28/2010

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
09/28/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/629,815	OHZUKU ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9,14 and 16-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-9,14 and 16-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/26/2010 has been entered.

Response to Amendment

This Office Action is responsive to the arguments filed on 8/26/2010. Claim 19 is added. Claims 1, 3-9, 14, 16-19 are pending.

Applicant's arguments have been considered. Claims 1, 3-9, 14, 16-19 are non-finally rejected for reasons stated herein below.

Information Disclosure Statement

The Information Disclosure Statements (IDS) filed 5/26/2010 and 8/26/2010 have been placed in the application file and the information referred to therein has been considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-8, 14, 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku (Layered Lithium Insertion Material of $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$ for Lithium-Ion Batteries, Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643, CL-010390) in view of Wada (US 5866279).

Ohzuku '390 discloses a positive electrode material comprising the formula $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$ (see Abstract).

Ohzuku '390 does not expressly disclose the crystal structure of the above formula as claimed by the Applicants in claims 1, 3, 4 and 6-8. The Examiner notes that while the prior art does not explicitly teach these properties, these are considered inherent in the prior art barring any differences shown by objective evidence between the positive electrode material disclosed in the prior art and the applicant. As the positive active material taught by the prior art and the applicant are identical within the scope of claims, 1, 3, 4, 6-8, Ohzuku '390 inherently teaches the crystalline properties as claimed by the Applicants. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999). The courts have held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. In re Best, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See MPEP 2112 and 2112.01.

When the Examiner has provided a sound bases for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the

applicant to prove that the product shown in the prior art does not possess the characteristics of the claimed product. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Ohzuku '390 does not disclose that the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level (Applicant's claim 1). It is noted that Applicants use the coprecipitation method to produce positive electrode material. The instant Specification pg 24 states that:

"First, the coprecipitation in step (a) is the method primarily to obtain a composite hydroxide by simultaneously coprecipitating a plurality of elements in an aqueous solution through neutralization reaction. In the case of using nickel, manganese and cobalt, since manganese is prone to be oxidized, manganese is sufficiently oxidized into trivalent manganese ions even by a trace amount of dissolved oxygen present in the aqueous solution. As a result, its dispersion and formation of solid solution at the atomic level is insufficient. The point of this step is to produce a double hydroxide or triple hydroxide by allowing nickel, manganese and cobalt elements to be present in one layered hydroxide without separation." (emphasis added)

Wada teaches of forming a lithium manganese oxide by using coprecipitation method. The oxides of the raw materials were mixed in solution and were allowed to coprecipitate. The coprecipitated powder was calcined to obtain the lithium manganese oxide. The obtained coprecipitated powder was calcined to obtain LiMn.sub.2 O.sub.4. The calcining conditions were such that firstly thermal decomposition was carried out in atmospheric air at a temperature of 400.degree. C. for 6 hours at a temperature-raising rate of 5.degree. C./min, then calcination was carried out in atmospheric air at a temperature of 750.degree. C. for 24 hours at a temperature-raising rate of

5.degree.C./min, and thereafter gradual cooling to 450.degree.C. was carried out at a rate of 0.2.degree.C./min, and then the product was maintained for 6 hours, and then cooled to a room temperature at a rate of 5.degree.C./min. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the lithium metal oxide of Ohzuku by coprecipitation, as taught by Wada, since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See KSR v. Teleflex, 127 S.Ct. 1727 (2007).

Thus, the forming the positive electrode material using the coprecipitation method of Ohzuku '813 inherently forms nickel, manganese, and cobalt elements being "uniformly dispersed at the atomic level" as claimed by Applicants in claim 1.

It is noted that Wada's temperature-raising rate of 5.degree.C./min reads on Applicant's "rapid heating".

Regarding claim 14, Ohzuku '390 discloses a $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$ electrode, but does not disclose a negative electrode material capable of absorbing and desorbing lithium ions and/or metal lithium and an electrolyte. Wada teaches a negative electrode material capable of absorbing and desorbing lithium ions (6:25-34) and an electrolyte (7:7-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a negative electrode material capable of absorbing and desorbing lithium ions and/or metal lithium and an electrolyte to the positive electrode material of Ohzuku '390 for the benefit of generating electrical power.

Regarding Applicant's claim 19, Wada teaches a cooling rate of 5.degree.C./min, not 7.degree.C./min. It has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). MPEP 2144.05

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku (Layered Lithium Insertion Material of $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$ for Lithium-Ion Batteries, Chemistry Letters 2001, the Chemical Society of Japan, pgs 642-643, CL-010390) in view of Wada (US 5866279) as applied to claim 1 above, and further in view of Miyasaka (US 6416902).

Ohzuku '390 modified by Wada teaches particles but does not disclose primary particles and secondary particles as claimed in Applicant's claim 9. However, Miyasaka discloses a lithium ion battery comprising a positive electrode with a mean grain size in the range of 3 to 15 um for secondary particles and in the range of 0.1 to 0.5 um for primary particles. The term secondary particle means a particle

consisting of aggregated primary particles (5:48-57). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have primary and secondary particles as taught by Miyasaka in the particles of Ohzuku '390 modified by Wada for the benefit of packing the primary particles between the secondary particles. It is noted that primary particles will be able to occupy void spaces between the secondary particles, and hence minimize void spaces.

Response to Arguments

Applicant's arguments regarding rapid heating and cooling are moot in view of the new grounds of rejection.

Applicant asserts that rapid heating or cooling causes the generation of distortion stress, and thus contributes to twining portion. The Examiner respectfully disagrees. Examples 1-3 and 1-4, which performed in lower performance than Examples 1-1 and 1-2, were formed by mixing powdered lithium hydroxide, powdered nickel hydroxide, and powdered manganese oxyhydroxide. See instant Specification pg 50, 1st full par. Examples 1-3 and 1-4 were not made by coprecipitation, as was for Examples 1-1 and 1-2. Further evidence would be needed to determine that the twining portions are formed due to rapid heating or cooling.

The following comments are made:

The instant Specification pgs 17, 2nd and 3rd full par. states that the crystal lattice of LiNi1/2Mn1/2O2 has defects and disorder in the crystal structure. However, it is

unclear if the defects are due to the coprecipitation method, or the rapid cooling and heating.

The instant Specification pgs 18-19 state that an equal ratio of nickel and manganese of 1:1 forms the superlattice arrangement of [~/3x~/3] R30°.

The instant Specification pg 26, 2nd full par. states that using lithium hydroxide, and not lithium carbonate, is advantageous in terms of crystallinity and controlling particle morphology.

The instant Specification pg 27, 1st par. states that amount of lithium is slightly increased when baking at a high temperature, when it is necessary to make primary particles after baking large (???), or when it is necessary to stabilize the crystal structure.

The instant Specification pg 28, 1st full par. states that it is preferred that rapid heating be performed at a rising temperature rate of not less than 7 °C/min and quenching be performed at a cooling rate of not less than 5 °C/min. Thereby, it is possible to control the grains within the primary particle as stated above.

Further evidence would bee needed to determine that the twining portions are formed as a result of rapid heating and cooling.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795